GAS JOURNAL, JUNE 10, 1942

VOL. 238 94th YEAR No. 4125

EDITORIAL NOTES

UNDER ONE UMBRELLA

MANY straws in the wind, some of them not of recent threshing, have pointed to unified control of the heat and power industries, and the Government's decision, announced last week, to establish a Ministry of Fuel, Light, and Power, while giving grounds for satisfaction, can have occasioned neither surprise nor excitement. In the first issue of the "JOURNAL" at the start of this year we put forward the view that development in the Gas Industry must be in concert with other fuel and power interests. The aim, we said, should be a comprehensive fuel scheme, each fuel being used in the sphere best fitted for it, with the interests of the public as the basic consideration, and we added: "When we think of the number of thoughtful and forceful suggestions and recommendations on the matter which have been put forward during the past twenty years it is dismaying that so far little has actually been done about it. However, 1942 may witness action as distinct from mere digestion of words. We should not be at all surprised if it sees the setting-up of a Ministry of Fuel." Now we have the new Ministry, which will control the coal industry, absorb the former Mines and Petroleum Departments of the Board of Trade, and will also take over such responsibilities for gas and electricity supply as are at present assigned to the Board. The change brings under the direct control of a single Minister of Cabinet rank all the functions of the Government in relation to the production and consumption of fuel and power.

We have spoken of straws in the wind, and would hesitate to conjecture when unified control of the fuel and power industries was first mooted; but at any rate in 1925 the Samuel Commission, dealing with the utilization of coal, pointed out that the question was not one of a simple choice between one or more alternative methods but of a balancing of a variety of factors, that it involved the co-ordination not, as was often supposed, of two industries but of several—coal, gas, electricity, coke, and chemical products. Since 1925 there has, of course, been a great increase in technical knowledge of the utilization of coal. Considering particularly the gas and electrical industries, both production and utilization efficiencies of these sources of energy have been raised. On the other hand, development has been unco-ordinated and reckless competition resulted in expensive overlapping of the two services prior to the war. Recommendations and suggestions made since 1925 resulted not in more collaboration, but in more and fiercer competition at the expense of the consumer in many instances.

In 1937, for example, Sir Philip Dawson, in his Presidential Address to the Institute of Fuel—an Address which met with publicity and comment on a nation-wide scale—made his central point that of co-ordination, and urged the establishment of one centralizing body—the Government—for the fuel industries. His plea was not so much for Government control as for a central and authoritative body to analyze all available experience and knowledge and define the most suitable policy for development in the national interest. He envisaged a new era in which coal would be treated as the raw material of a manufacturing process, in which a central authority would make clear the road for each section of the fuel industry to travel. He spoke of a clear field for unfettered development, and visualized a smokeless atmosphere in which to live and suitable solid, liquid, and gaseous fuels for every sphere of the nation's activities.

In the same year, 1937—and we do not regard it as inappropriate or out of tune to recall this—Sir David Milne-Watson particularized on the fields which gas and electricity were perhaps best fitted to occupy in the national interest. His view at the time was that the proper fields of electrical expansion in Britain were industrial power, suburban railway transport and rural development, household power in some forms, and some portion, but not a very large portion, of domestic heating, cooking, and water heating. That was, of course, excluding the lighting load. "For gas and coke," he said, "the obvious and natural field is that of household heating in its three phases of cooking food, warming rooms, and heating water, and industrial heat in the provision of an exactly controllable fuel for factory furnace work of almost all kinds." Competition became keener—and then came the war. After two years of hostilities Sir David maintained that if measures were not taken to prevent it, the various fuel industries would at the end of the war revert, if not to the state of affairs which prevailed before the war, at least to something like it ("JOURNAL" of Oct. 29, 1941). He defined as a first essential that production, distribution, and utilization of all fuels (including electricity, of course) should be regarded as a single problem. He advocated a comprehensive fuel scheme, each fuel being used in the sphere best fitted for it, with the interests of the public as the basic consideration; he advocated that the problem should become the sole responsibility of a Minister of the Crown, that in the national interest a Ministry of Fuel should be formed.

We make no attempt to picture anything like a complete background, but we would also recall the remarks at the Institution meeting in June last of Dr. E. W. Smith, now Director-General of Gas Supply. He asked that the Government should formulate its policy concerning fuel and power. "I believe," he said, "that a Ministry of Fuel and Power, if formed, should be the most important Ministry of the Government so far as our natural resources are concerned." But he queried how the Gas Industry would stand under such a regime, and suggested that as an Industry we counted for too little because we were "little more than a loose aggregation of individual independent entities" ("JOURNAL" of June 25, 1941). That was a year ago, and since then there has been a considerable flow of water under the unshattered bridges of the Thames and also not a little hard thinking on the Industry's part. Our anticipation during the past twelve months in meetings of the District Gas Associations has impressed us first and foremost with the growing realization that there is no place in the Industry any longer for the parochial attitude or the petty spirit, and recently we have had assurance from Dr. Smith that at no period in the history of the Industry has its good name sounded fairer or its reputation stood higher in Government circles than obtains to-day. We welcome the Ministry of Fuel, Light, and Power, and look to its ministrations in a general way without undue trepidation, and hope later to learn of and discuss the specific reactions of the Industry to this

§§§

important move. We could have wished, of course, that the move could have been made in peaceful circumstances rather than in these times of turmoil.

FUEL RATIONING

WE were not at all surprised at the Government's announcement last week that fuel rationing on a compulsory basis was to be postponed; nor were we surprised at the simultaneous announcement that a scheme showing practically no deviation from the original Beveridge plan was to be prepared and held in reserve for immediate application when deemed necessary—this in spite of the volume of criticism of the "points" system and of the labour and paper involved. What is necessary at once is that the public should restrict their fuel consumption voluntarily "as nearly as possible to the limits which would be imposed on them if rationing were introduced." We quote from the White Paper on Coal issued by the Government last Wednesday. The words "as nearly as possible" trouble us. Either the limits laid down are necessary or they are not necessary, and it would appear that the Government is prepared to allow a margin on fuel consumption, and this to our mind is not a good start to a campaign on voluntary economy. Perhaps others can read something "between the lines" of the statement which we cannot perceive. Be that as it may; the gas and electrical industries, as a later paragraph in our issue to-day indicates, are determined to do all they can to add both weight and urgency to the Government's call for fuel economy on a voluntary basis. We may be cynical, but we think that the biggest—by far the biggest—influence on the success which may meet forthcoming propaganda on voluntary rationing and advice on methods of economy will be the knowledge of each individual consumer that compulsory measures have not been dropped, and that if he does not in fact economize he will at any time be made to do so. In brief, to our mind the shadow of compulsion will work more effectively than any broadcast speech or "timely hint" given ever so industriously and methodically by gas or electricity undertaking. Without the shadow of compulsion there would be a tendency, we think, for one house holder to regard fuel rationing as being his neighbour's voluntary concern. And no total of fuel saved can be an expression of the extent of individual economy on a purely voluntary basis.

As we have been told by the Government so firmly that fuel economy is necessary to the maximum war effort, and equally firmly that irrespective of the total tonnage of coal annually mined allocation to essential and less essential purposes is vital, while we hope that compulsory rationing can be avoided, we welcome rather than otherwise this shadow of compulsion, and welcome, too, adherence in principle to the Beveridge scheme and the setting out in an Annex to the White Paper of the amounts of fuel which would be available to domestic consumers on the first application of compulsory rationing. The underlying equity of the scheme as an endeavour to provide warmth for all has appealed to us from the start, and in spite of what cynicism may be attributed to us, we have sufficient faith in the commonsense and intelligence of the average British householder to believe that minor difficulties which the plan may and must involve would be flexibly solved without hardship and without coming to blows. Certainly hardship could not accompany the allowances of fuel proposed as a first step. The scale and the proposals are published on p. 412 of to-day's "JOURNAL," and on the score of indoor warmth those in the northerly parts of Britain can have no grumble about their fellow countrymen living and working a few yards nearer the Equator. We think it not unreasonable to assume that in wartime and on average a seven-room house as assessed in the household ration scale could well accommodate seven people. Let us take as example —a seven room house in Scotland or the North of England. With seven occupants the fuel ration would be 137½ cwt. of coal a year. Its equivalent in gas would be 687.5 therms; in electricity it would be 13,750 units. This is not verging on fuel starvation. In the South of England a home with four rooms and four occupants would be allowed 70 cwt. of coal a year, the gas equivalent being 350 therms, and the electricity equivalent 7,000 units. And in addition a supplementary ration may also be given for special needs, such as sickness necessitating additional fuel, or bomb damage. It is estimated in the White Paper that the scale would produce a total saving of 10 million tons of coal in a full year. We conclude that the variations in fuel consumption must be very great indeed; and we suggest that calculations on the lines of the foregoing would promote a useful train of thought. Any hardship is obviously remote.

We need not discuss the means by which the Government propose to increase coal production. Obviously increased production is vital, but as an Industry we are primarily concerned with the allocation of coal and its utilization in the form of gas and coke. We are, however, glad to note that the Government is satisfied that substantial economies can be obtained from industrial consumers without damage to war production—economies in coal, gas, and electricity. Since the establishment of the Directorate of Gas Supply we have on several occasions recorded the great savings which have been made in gas consumption as a result of the work of what have been termed "gas chasers" in encouraging industrial managements to take a live and intelligent interest in fuel consumption at their establishments. And we are glad, too, that "a scheme for making definite allocations to the main consuming industries is now being worked out by the Mines Department."

Voluntary Fuel Economy Campaign

The Joint Committee of Electricity Associations and the National Gas Council have offered their complete support to the new Minister of Fuel, Light, and Power in launching a nation-wide publicity scheme to educate not only householders and others, but also industrial users, in the most effective means of obtaining voluntary economy in the consumption of fuel, in order to avoid if possible an enforced rationing system. They have already by a previous statement given support to Lord Kemsley in his efforts to inaugurate a voluntary campaign.

Lighting Restrictions

Since it appears that doubt exists about the effect of the Advertisement Lighting (Restriction) Order, 1942, which came into force on May 18, the Board of Trade make it clear that the chief object of this Order is to prohibit the use at any time of electricity or other artificial illuminants for such purposes as the lighting of shop windows and show cases, except insofar as the particular lighting fittings used are reasonably necessary for illuminating the general interior of the shop for the purpose of serving the public. The prohibition also applies to show cases used to display a shop's wares in premises other than the shop itself, as, for example, in tube stations.

Personal

Mr. H. F. FLANNERY, M.B.E., A.M.I.C.E., M.I.N.A., has been elected a Director of the South Metropolitan Gas Company in the place of the late Mr. Harold Murphy, K.C.

* * *

Mr. PERCIVAL WHEELER has been appointed as the Assistant Regional Liaison Officer to the Gas Directorate attached to Mr. Jamieson, who is in charge of the Midlands, North Midlands, and Eastern Regions (with the exception of Hertfordshire and Essex). Mr. Jamieson, whose address is Cavendish House, Waterloo Street, Birmingham, telephone Birmingham Central 7391, also has charge of Denbigh, Merioneth, Flint, Caernarvon, and Anglesea.

* * *

Mr. F. B. WALLER has succeeded Mr. T. H. Woodcock as Engineer and Manager to the Stroud Gas Company as from June 1. Mr.

Woodcock retires on Sept. 1, and his services will be retained in an advisory capacity as a Director of the Company.

* * *

Consequent upon the death of Col. W. H. Ritson, late Chairman of the Shotley Bridge and Consett District Gas Company, Lt.-Col. C. W. RITSON, O.B.E., J.P., has been appointed Chairman and Mr. G. A. COWEN has been elected to the Board of Directors.

Obituary

Alfred Harrison

Not unexpectedly to us who have been in close touch with him ever since his retirement, ALFRED HARRISON died on Thursday, June 4, at his home at Walton-on-Thames. Though the final acute stage of his illness set in only about two months ago, we had felt for a year or more that his health was failing, and that a lifetime of hard work was drawing to a close. Though he, too, must have realized it and indeed suffered considerably, typically he bore his pain in silence to save others from distress. He was in his 75th year.

It is a strange coincidence that it is in Institution Week that we have to record his passing—that week which, though only the shadow of it remains under wartime conditions, had been the culminating point of so many years of Alfred Harrison's life. An excerpt from a diary written in minute shorthand characters, which he was fond of quoting as a "boyhood folly," recorded on Feb. 22, 1886, that he "began work for Mr. King," and from that day on he served the late Walter King, and subsequently Walter King, Ltd., with single-mindedness and devotion. Indeed, it might well be said that the "JOURNAL" was his life, as might also be said of Walter King himself, of Bezant, of Morris, who all lived and died in its service, and in building up the tradition of which we, and we believe the whole Gas Industry, are proud.

It was not until the death in 1928 of Arthur Bezant—slightly his senior in service—that Alfred Harrison's ambition was realized, but the Directors then unhesitatingly appointed him Editor. For this post he was fully qualified by his long apprenticeship on the editorial

staff, during which he had acquired an intimate knowledge of the Gas Industry through its period of greatest development and of its personnel. Though at his advanced age a long occupancy of the editorial chair was not to be expected, his steady judgment and cautious temperament were invaluable in a period which covered the great commercial slump and the recovery of the early 1930's. Though the "JOURNAL" passed its 85th year during his editorship, it was noted at the time that he had had only four predecessors in that office—Thomas Barlow, William B. King, Walter King, and A. F. Bezant. He retired from active service at the end of March, 1934, and was appointed a Director. We shall sorely miss his sound judgment on the Board, and his capacity for summing-up a question after every angle of it had been discussed.

He retained his skill as a reporter to the end, and could invariably be relied upon to remain unruffled—and deadly accurate—through the most heated argument. For very many years—including even the present one—he had taken the official reports of most of the big London Gas Company meetings, and the names of the recalcitrant shareholders with their "hardy annual" criticisms were as well known to him as to the criticized directors and secretaries. He had, of course, attended district association meetings by the hundred, his chief "regulars" being Wales and Ireland. In the former he had a vast admiration for the late Octavius Thomas, whose passing was a great blow to him, while the Irish meeting had constituted just about all the annual holiday he allowed himself from time immemorial. His many friends over there may be interested to know that Alfred Harrison's last contribution to the "JOURNAL" was the editorial comment on April 8 last on the new Northern Ireland Association. Ailing as he was at the time, we knew the pleasure it would give him to write on what had long been regarded as one of his special provinces.

And so, following Julia King and J. A. Morris last year, we of the "JOURNAL" lose yet another of our stalwarts. The writer can remember him almost as far back as he can remember anything. He can remember the confidence Walter King had in his sub-editor, which has been more than fully justified since responsibility has fallen on us of the next generation. He can remember wondering many years ago why A. H. was known to his contemporaries as "the Baron," but no one has ever been able to give any better explanation than that they held him in great affection, which is quite good enough for us. Sorrow has clouded his private life in recent years. His wife died suddenly the first Christmas following his retirement; his elder daughter was killed in an accident in New Zealand a year or two ago. Yet he never intruded his private sorrows upon others, and in his own particular way, which we and others understood quite well, he looked on life with good humour to the end. The sympathy of us all, Directors and staff, go to his surviving daughter. W. R. K.

Letter to the Editor

Post-War Housing

DEAR SIR,—I was particularly fascinated by the sketches of a house in the issue of the "JOURNAL" of May 27 accompanying the article by Messrs. Potterton (Heating Engineers), Ltd., on a suggestion put forward by them for post-war housing construction. I had a house built about a year before the outbreak of war that very closely follows their idea. From my own experience it is a type to be strongly recommended.

As a matter of fact, my house is constructed on a principle not well known in this country, insofar as the outer wall is single brick and the whole interior construction is wood, so that the outer wall is partially brick and wood with air space between, the roof being carried on the wood construction. Even if the whole of the brickwork fell away the house would still stand. The construction is pleasant in summer and warm in winter.

Yours faithfully,
J. MARTIN BLAIR.

19, Pierrepont Road,
Acton, W. 3.
May 29, 1942.

The 1st Annual General Meeting of the Gas Research Board will be held at 1, Grosvenor Place, S.W. 1, on June 11 at 2 p.m., for the purpose of receiving the Annual Reports for the years 1939–40 and 1940–41 and the Accounts for the year 1941, and the election of Officers and Auditors.

Arbroath Town Council agreed at a meeting on May 27 to apply to the Board of Trade for permission to reduce the calorific value of the gas produced to 400 B.Th.U. per cu.ft. as against 450.

Having a Favourable Balance for the year, the Skelmersdale Urban District Council has approved the recommendation of the Gas and Water Engineer to reduce the price of gas by 2d. per therm, as from the next reading of the meters.

The Annual Meeting of the Plymouth and Stonehouse Gas Light & Coke Company will be held at the Gas-Works, Coxside, Plymouth, at noon on June 25, and the Directors have decided to recommend the shareholders to authorize the payment of a dividend for the year ended March 31 last, to be paid on July 1, at the rate of £2 10s.% on the Ordinary stock, 7s. 6d. on the "Additional" shares, and 7s. on the New shares, Act 1879, less income-tax at 10s. in the £.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

THE POLICY AND SCOPE OF THE GAS RESEARCH BOARD*

By E. V. EVANS, O.B.E., F.I.C.

Chairman of Council, The Gas Research Board

As the youngest of the National Bodies serving the Gas Industry of the United Kingdom, the Gas Research Board has to take its place alongside older organizations with a substantial record of effective service. In normal times it would have been the concern of all members of the Gas Industry to see that the new recruit developed in a worthy manner, and the Autumn Research Meetings would have given an opportunity for discussion of the work of the Board, of its policy and its programme. War conditions have made this undesirable and have made impossible the development of the Gas Research Board to the extent that was hoped for at its inception. As a means of enlisting the interest and help of members of our Industry who may not have had the opportunity of understanding the aim of this new association, it is thought to be appropriate that this statement should be made.

Policy of the Gas Research Board

In broad terms it may be said that the policy of the Gas Research Board is to stimulate the application of existing knowledge and to encourage the search for new knowledge, thereby assisting the Gas Industry of the United Kingdom to discharge more effectively its duty to the community. For this definition of policy to have any meaning, it is necessary to have a clear conception of the duty which the Gas Industry endeavours to discharge. May it, therefore, be postulated that the function of the Gas Industry is to convert coal into gaseous, solid and liquid fuels, thereby increasing the ease and effectiveness with which heat may be obtained, saving transport and unnecessary labour, reducing atmospheric pollution with its damage to health and property, and ensuring that the fullest value, either as fuel or as chemical products, is extracted from each ton of coal while increasing the amenities of life.

The Gas Industry has good reason to be proud of its past achievements which have brought so much added comfort and convenience to almost every home, but it cannot be satisfied with the past alone or even with its present service. John Stuart Mill has spoken of "uncontented characters", and such should we all be. As public demands change and new methods of satisfying these demands are required, the new method must be sought and found. Only some 20 to 25 per cent of domestic heat demands are met by gas, and a further small percentage by coke. The challenge is there, and the Industry's tradition of public service requires that the challenge shall be met by continuous evolution in the future as in the past.

Research

What, in this connexion, is the meaning of research? This unhappy word has suffered much abuse. It may be used to impart a spurious air of importance to work of trivial value, or to suggest profound wisdom where ignorance exists. It is thought by some to be a talisman of miraculous power, and by others to be an excuse for unfettered extravagance. In truth, it is none of these things: chiefly, it is a way of thought; an attitude of mind. The painstaking acquisition of facts, the verification of facts and their assembly into an orderly pattern or part of a pattern of knowledge, is the meaning of research. It requires patience, judgment and skill to collect facts and to distinguish between fact and fallacy, broad imagination to commence the building of a pattern, and the power to perceive the form of the completed pattern when only a fragment is known. While it is no part of the functions of the Gas Research Board to formulate the policy of the Gas Industry and it would be a presumption to attempt it, one may desire that the attitude of mind which has led to such great developments in chemical, physical and biological science may be used to direct the progress of that Industry which the Gas Research Board is destined to serve. The principles of research are applicable not only to chemical and physical phenomena, though it is in connexion with these that the term is most frequently used. In every field of human endeavour, economic as well as technical, where achievement is capable of being measured, the research method can be used with benefit to the speed of progress and the avoidance of wasted effort.

The Need for a Gas Research Board

It may be asked why it was thought necessary to form a Gas Research Board. A certain amount of very useful work had been and was being performed by the Research Committees of The Institution of Gas Engineers. In the laboratories of Gas Undertakings and of firms making plant and appliances, a substantial amount of research and experimental work was in progress, and the total sum of the Industry's effort in work of this nature was much greater than was often supposed. Nevertheless, most of this work was unco-ordinated, and frequently related more to the solution of local problems than to the broader, general problems of the Industry as a whole. Gas Undertakings do not compete commercially with one another, though there is a natural and healthy desire to enhance the reputation of one's own Undertaking, but plant and appliance manufacturers do compete in their business activities. While there are obvious difficulties in the way of a free interchange of detailed technical information between competing firms, there remain many problems that are common to all, and the solution of these is a matter of importance to the entire Industry. Now, there is not an unlimited supply of people having the combination of ability and experience that is required for studying the broader problems of the Gas Industry, and it seemed that the best use of the research ability within the Industry would be realized by inviting co-operation of all units through a central research association.

Many of the larger firms and Undertakings in the Industry have been accustomed to give freely their knowledge and research results to those less fortunately situated, but there is always a natural reluctance to seek advice from an organization which may be willing to give, but in which the seeker has no share. It is hoped that each Undertaking, firm and Institution member will, in due course, become a member of the Gas Research Board and so feel that they have a right to ask for help and advice as well as a duty to contribute their knowledge and ideas to an organization in which they truly have a share. Gas Undertakings representing 76 per cent of the country's gas output have already allied themselves to the Gas Research Board, and this should ensure that those whose chief task consists in the daily routine of keeping the machinery of the Industry at work will be given the fullest opportunity of maintaining and increasing their interest in future development.

Central co-ordination must not result in lessened general interest in research problems. It would be a great mistake to discourage the chemist in a works laboratory from studying for himself some problem which has excited his interest and curiosity. Centralized research should not mean the stifling of initiative, but should offer to such a man the opportunity of getting into touch with others with like interests and developing his ideas to an extent which might well prove impossible without assistance.

There is no good reason for suggesting that the best ideas are born in the largest laboratories, but it is a fact that any idea has a better chance of survival and growth if suitable facilities are available. Ranking high amongst facilities is money, and a sound idea may have to be abandoned because the money is not available for its development. What may appear to be quite a simple investigation may prove un-

* Paper to the Institution of Gas Engineers, June 10. [Communication No. 248.]

expectedly costly in time or in apparatus, and it is here that a pooling of ideas and facilities should be helpful.

On the question of funds, it will be known that the Government has shown its readiness, on the recommendation of the Department of Scientific and Industrial Research, to give substantial financial assistance to industrial research associations, particularly where an association is already being wholeheartedly supported by its own industry. The Gas Research Board has thought it better not to make application for such assistance for the present, though the Articles of Association have been drawn up with the advice and guidance of the Department of Scientific and Industrial Research, so that, at the appropriate time, application for a grant may be made.

Present Difficulties

It is to be regretted that the Gas Research Board was unable to become a real working force before the country came into the war, and it is suggested that the earliest opportunity should be taken to become a state-aided body, as apart from the fact that a state contribution to the development of our Industry is completely justified, we merit the status that governmental interest would confer upon us.

Much of the success of a research association depends upon the selection of a suitable Director of Research, and it has been one of the unfortunate consequences of war that the Gas Research Board has been compelled to postpone making this appointment. The Acting Director has worked exceedingly hard and ably, but it is too much to expect any man to be able to occupy several important offices and discharge fully the duties of each. The appointment of a full-time Director with suitable assistance is an essential preliminary to the development of the work of the Board.

The Work of the Gas Research Board.

From what has been stated it will be seen that the work of the Gas Research Board is two-fold. That part which consists in making better use of existing knowledge needs different treatment from that which is concerned with the acquisition of new knowledge, though the two are inevitably linked closely together.

Utilization of Existing Knowledge

There is in existence a very large amount of information on the numerous subjects of interest to the Gas Industry, some of it abstruse, some of a practical nature, and it is quite impossible for any man to carry in his own head or in reference works at his elbow, the accumulated experience in any branch of modern technology. Much existing information is scattered and its existence known to relatively few specialists, but its application may be of great value to someone whose main activities have lain in quite another direction. This situation is common throughout the world of science, where the output of information outruns the speed with which practical use can be made of the new data. It has been suggested at times that a halt should be called in academic research until practical and useful achievement shall have caught up in the race, but it is, of course, impossible, even if it were desirable, to stop enquiring minds from seeking answers to the questions their curiosity asks. A more practical way of making the best use of accumulated information is to have collected together in one place at least the keys that will give access to the specialized knowledge relating to a particular line of activity. The Gas Research Board will regard it as one of its first duties when normal times return to establish a bureau of information and data.

It is no matter for shame that a man with a commercial training is unable to understand the implications of some development of physical or chemical theory and the possible effect of the development on the finances of his Undertaking, although it may be added, as a personal opinion, that a man attaining administrative responsibilities should be equipped with such an understanding of the nature of scientific progress and principles of the application of science to industry as to place him in sympathy with his technical staff. A chemist who is specialized in organic chemistry and is capable of investigating the problems associated with the carbonization of coal may find it difficult to follow a mathematical treatment of the mechanism of combustion as it affects the design of gas appliances. It is important, therefore, that all the efforts of the Industry shall be integrated and to ensure that this is possible there must be means of interpreting specialist knowledge in terms that are readily comprehended by those who have to make use of the knowledge. The most appropriate means of achieving this interpretation is a matter which has yet to be considered in detail by the Council of the Board.

Those who have had personal experience in searching technical literature for information on a subject will know of the many gaps and contradictions that appear. There seem to be answers to every question except that one that needs an immediate answer, and despite the amount of information which is partially helpful there is, most times, the need for further experimental work. Whether or not such work should be carried out in laboratories set up by the Gas Research Board is a question that the future must decide. There is a danger in employing research chemists and physicists in a laboratory before the nature of their work is clearly defined, because such research workers could so easily become detached from reality and make experimental work an end in itself instead of a means to an end. On this matter the Board will be guided by the needs of the Industry and by the advice of its Director.

There can be little doubt, however, that whilst a research programme of the Board will be carried out by its own research staff, a considerable part will be entrusted to the laboratories of Universities, Technical Colleges or Government Research Establishments. There are various advantages in proceeding in this way; the assistance of specialists on particular subjects is enlisted, their interest in the Gas Industry and its problems is aroused, and the research student may be encouraged eventually to enter the Industry whose problems he has been investigating.

There should also be an increasing interchange of ideas and information between the Gas Research Board and other kindred research organizations, to their mutual advantage. Some duplication in research is useful and even necessary, but much undesirable overlapping is avoidable. Within the great volume of research work that is constantly in progress in the several industrial research associations, there is much that may bear closely upon the problems of our Industry, and it is one of the duties of the Gas Research Board to ensure that no outside observation or theory that can assist it in its own investigations is allowed to pass unnoticed.

Acquisition of New Knowledge

The second side of the work of the Gas Research Board consists in stimulating the search for new knowledge and an understanding of how this work is to be undertaken needs an explanation of the nature of different types of research work. If there are in existence the laboratory and monetary facilities for individuals to carry out experimental work, there will also be some men desirous of adding to our knowledge and understanding by investigation. Such a man may, for example, feel an impelling desire to know more about the distribution of surface energy on the faces of crystals. He would not have in mind any practical application of the knowledge, and would not care if there were none, but he would simply feel a strong desire to acquire knowledge upon this particular subject. If his ability and keenness are well matched, he may obtain new knowledge of interest only to a limited group of workers in kindred subjects, but each new discovery will give rise to new questions, and such a man may well spend his lifetime on studies arising from one question of purely academic interest. This is pure, basic or fundamental research and cannot be initiated or directed save by the man's own thirst for knowledge, which may have been stimulated by the teaching of his professor, by his fellow students, or by his reading.

A study of this nature may, however, hold immense possibilities for industrial development in, for example, metallurgy or catalytic synthesis, and it is the function of an industrial research association to be aware of such work, to give financial assistance if needed, and to see that the possible developments are not neglected. The research association may make use of a number of means to this end. It may be that the man himself would prefer to follow one particular development of his work to a practical conclusion, or some one associated with him may do so. There may be, at some other research centre, workers who are familiar with the technique and have a special interest in industrial

developments. Sometimes it may be necessary to engage chemists or physicists specially to follow up the new idea and they may work alongside the originator or elsewhere, but in frequent contact with him. It may be preferable to work with several groups of people each developing a separate aspect, but the work will have ceased to be pure research; it has become purposive. That is to say, there is a practical application more or less definitely in view.

Purposive investigation may range from purely laboratory experiments on theoretical issues to the erection and operation of experimental plants, and all stages are properly within the province of an industrial research association. As the scale of operation increases and the new development approaches industrial application, practical questions of costs, life of plant, market for products and so forth arise. While the research association must take cognizance of such matters, it cannot be wholly responsible for those final stages of commercial development which are the business of industry itself. The data acquired during the experimental stage will form the basis of commercial development, but the responsibility passes from the research association. The conditions under which industry, either Gas Undertakings or manufacturing firms, may take over new developments from the Board require detailed formulation, but the principle to be observed is that data and experimental results obtained by the work of the Board shall be the property of all members and not only of a few.

In this brief review an attempt has been made to give some idea of the meaning of research and the way in which an industrial research association forms a necessary link between pure science and its industrial application. This is the day of research organizations, and experience has taught that for an industry to develop so as to become of the greatest possible national value it must possess a centralized body of investigators with one common aim.

SCIENTIFIC CONTROL IN THE RETORT HOUSE AND ITS CONTRIBUTION TO NATIONAL FUEL ECONOMY*

By T. CAMPBELL FINLAYSON, M.Sc., M.I.Chem.E.

Director, The Woodall-Duckham Company, Guildford.

In order to play its part in national fuel economy, it is the duty of the Gas Industry to ensure that the carbonization process is carried out in such a way that the maximum proportion of the therms contained in coal are converted into gaseous, liquid and solid products.

Without some degree of scientific control it is impossible to operate a carbonizing plant at its maximum efficiency. Scientific control in the retort house has three main functions:

(*a*) It provides the necessary information to enable the carbonization process to be dissected into its various parts.

(*b*) It makes it possible to follow the effect of changes which may have been instituted to improve operating efficiency.

(*c*) It enables the best results to be reproduced, based on records of previous experience.

It must be made clear in commencing this Paper that scientific control does not depend upon the installation of a large number of complicated recording instruments. Charts and records in themselves do not secure efficiency of operation. It is the interpretation of the collected data which leads to the desired result. Consequently, unless there is available technical staff who have time to study the results and who have sufficient knowledge of the working of the instruments to judge whether or not they are performing satisfactorily, scientific control is of limited value.

Technical Supervision

The first step in scientific control in the retort house is to provide adequate technical supervision. It is suggested that there is a tendency to regard the whole-time attention of a good technical man in the retort house as a luxury which can be afforded only by large Gas Undertakings. The great value of the materials being treated and of the products being made in a modern Gas Works is sometimes not fully appreciated.

The cost of technical supervision may perhaps be illustrated by a simple calculation. On a carbonizing plant making 1 mill. cu.ft. of gas per day for 250 days per annum, the cost of a technical assistant at £350 per annum is recovered if his work leads to an improvement in the gas yield of 1 therm per ton of coal accompanied by a reduction in the producer fuel consumption of 0·1 cwt. per ton of coal carbonized—a modest achievement which should be easily attainable.

It would be of interest to know how many of the Undertakings which produce more than 1 mill. cu.ft. of gas per day have on their staff a technical man whose primary function is the control of the retort house. Seeing that the retort house is still the heart of the Undertaking, such work is an excellent training ground for the young man who eventually may rise to the control of a Works or even of an Undertaking. The technical assistant who is to control the operations in the retort house should:

(i) Have had a technical training so as to be able to understand the broad engineering and chemical principles of the process of carbonization.

(ii) Have had special training in the working principles of the instruments and apparatus under his control.

(iii) Have the authority to make changes in the retort house conditions.

(iv) Have time to assemble and interpret the information he collects.

The educational courses laid down by The Institution of Gas Engineers form a satisfactory basis for the essential knowledge required by the technical assistant.

A greater amount of attention, both practical and theoretical, could with advantage be paid to the subject of the use and maintenance of the scientific instruments which are likely to be found in modern retort houses, covering such matters as temperature and pressure measurement, gas analysis, sampling of gases, liquids and solids, and recording instruments.

Scientific Control in the Retort House

For the purpose of scientific control the carbonization process can be divided into the following sections:

(*a*) Producer gas generation.

(*b*) Retort heating system.

(*c*) Coal carbonization.

(*d*) Waste heat recovery.

The limitations of a short Paper preclude the consideration of the application of scientific control to the various forms of carbonizing plant in use today. In order to avoid the charge of writing a number of generalizations—which satisfy nobody—the scientific control of a continuous vertical retort installation has been selected as an example. In view of the fact that more than half of the total coal carbonized in Great Britain is treated in this type of plant, the notes may be of interest to the majority of gas engineers.

(a) *Producer Gas Generation*

The carbonization process can only be maintained at a high efficiency if the combustion chamber temperatures remain constant. The most important factor in securing constant combustion chamber temperatures is to have available a constant supply of producer gas of constant quality. Scientific control of producer gas generation must be directed towards these two ends. Control of the volume of producer gas passing forward to the setting should be arranged by

* Paper to the Institution of Gas Engineers, June 10. [Communication No. 248.]]

providing an accurate recording pressure gauge of the bell-type at a convenient point in the producer gas distributing main. It is found advantageous to have this main under slight pressure to avoid air infiltration and consequent combustion. This recording pressure gauge is a most important "tell-tale" as regards producer operation, and can be used to judge whether regular attention is being given to fire-cleaning.

Supply of primary air can conveniently be arranged by means of steam jet blowers of the venturi type. Gauges should be available to determine the steam pressure, and arrangements should be provided to vary the amount of air admission to the venturi blowers. With a given steam orifice, it is thus possible to vary not only the total quantity of air-steam mixture but also the air-steam ratio. By variation of the air-steam quantity and the pressure of the mixture under the grate, it is possible to maintain constant pressure at the recording instrument even when the condition of the fires varies due to change in fuel.

The determination of the correct quantities of air and steam can be judged by taking a sample of producer gas and testing for carbon monoxide and carbon dioxide and (if possible) hydrogen. For normal conditions the carbon monoxide content should be about 26 per cent and the carbon dioxide content about 7 per cent.

It is a surprising fact how many installations make no provision for weighing producer fuel. Measurement by volume can at best be only an approximation. Means should be provided for weighing the fuel wherever possible. Loss of carbon in clinker and ashes should be kept under observation by regular sampling.

Close attention to producer gas generation is one of the most certain methods of effecting economies in plant operation. It should be remembered that a plant making, say, 1 mill. cu.ft. of gas per day will use as producer fuel over £5,000 worth of coke per annum.

(b) *Retort Heating System*

It is important to maintain correct temperature conditions at all times to ensure the efficient carbonization of the coal and to prevent damage to setting brickwork. From the point of view of fuel economy the aim is to secure the required combustion chamber temperatures with the minimum consumption of producer gas. This depends on the following factors:

(i) Accurate determination of temperatures, for which purpose the disappearing filament pyrometer is found to be a useful instrument. Temperatures in the combustion chambers should be taken daily and the instrument should be checked at least once every six months against a standard lamp. An instrument which is reading 25°C. low can cause an appreciable waste of producer fuel, since the combustion chamber temperatures may be maintained unnecessarily high.

(ii) Periodical determination of the composition of the waste gases. Excess carbon monoxide or excess oxygen in waste gases means waste of producer gas. In addition, the presence of carbon monoxide in the waste gases leaving the combustion chambers may cause local overheating in the main waste-gas flue when the carbon monoxide mixes with waste gases containing oxygen from other combustion flues. It is found in practice that the carbon dioxide content at the outlet of the combustion chambers can be maintained at 17 to 18 per cent with reasonable care.

(iii) Each design of setting is found to work most efficiently under one set of pressure conditions. It is an advantage from time to time to make a pressure survey and to adjust the setting to the pressure conditions which have been found to give the optimum results. Such a pressure survey also indicates and locates any dust deposits in the flues. For this purpose a sensitive portable pressure gauge is necessary.

To maintain steady setting temperatures it is necessary to keep a constant pull in the main waste-gas flue, and a sensitive draught indicator is of vital importance. A recording instrument at this point is an advantage but is not essential.

(c) *Coal Carbonization*

In order to operate a continuous vertical retort plant at maximum efficiency the following factors should receive careful attention:

(i) *Regularity of Coal Travel.*—The rate of travel of coal through the retorts should be kept as nearly constant as possible. Some simple means of indicating the amount of coal which has entered the retort each hour is a very useful "tell-tale" of the way in which a retort is working.

(ii) *Regularity of Coke Extraction.*—The rate of coke extraction governs the working of a continuous vertical retort. The checking of individual extractor speeds justifies the time spent. It is also to be remembered that change in coal may alter the rate of coke extraction with a given extractor speed. It is, therefore, necessary to keep an eye on the actual quantity of coke extracted.

(iii) *Retort Pressure Conditions.*—It is found in practice that best results are obtained by operating the retorts with level gauge or slight pressure at the off-takes. This pressure should be checked regularly and should be automatically controlled by some type of sensitive retort-house governor. A recording pressure gauge should be installed at the top charging platform to record the pressure at the inlet governor.

(iv) *Scurfing Routine.*—An item which merits careful attention is the carrying out of a regular scurfing programme. Retorts which are "overdue" for scurfing are a drag on the results of the whole plant. The scurf takes an excessive time to burn off from "overdue" retorts and wastes time and fuel. Regular scurfing, expeditiously carried out, has a noticeable influence on the fuel consumption of the plant.

(v) *Control of Calorific Value.*—The calorific value of the gas should be controlled by variation in the percentage steaming. Reduction of calorific value by "pulling" should be avoided. Steam supply to retorts should be measured either by the use of orifices and pressure gauges or by regulating valves to each retort.

(vi) *Gas Analysis.*—Wherever possible, complete analysis of the various constituents of gas is desirable, but Orsat determinations are useful indications of conditions, provided the analysis includes carbon dioxide, oxygen, carbon monoxide and nitrogen (by direct combustion). Any analyses of crude gas from the retorts should be taken on samples collected over a number of hours. The study of the analysis of crude gas reveals the nature of any infiltration into the gas stream.

Gas analysis at the inlet retort-house governor should, wherever possible, be checked up against analysis at inlet station meter. All the effort applied in improving the efficiency in the retort house may easily be nullified by the addition of excessive or uncontrolled air at the purifiers. Assuming that gas with a calorific value of 480 B.Th.U. per cu.ft. is required and that 0·5 per cent of oxygen is attainable in gas after purification, then each 0·1 per cent of oxygen above this figure means a reduction of approximately 0·5 therm per ton of coal. Bad purification practice has thus a direct connexion with national fuel economy.

(vii) *Gas-Making Results.*—One of the most important factors in securing efficient retort house practice is to have available at regular intervals accurate gas-making results. This involves accurate measurement (not calculation) of coal weight, gas make and gas calorific value. Without accurate figures on all three of these items gas-making results are meaningless.

As a means of assessing the efficiency of the gas-making process the Hydrocarbon Enrichment Value index developed by S. Pexton fills a most useful function. The Pexton formula focuses attention upon the fact that the essential feature of efficient gas manufacture is to produce the maximum yield of "enrichers", i.e., those constituents of gas with a calorific value above that of carbon monoxide and hydrogen. It may be of interest to record that much use of this formula has shown that when it is desired to compare the H.E.V. obtained on plants carbonizing coals which differ substantially in their ash and moisture content, it is an advantage to express the results in terms of a "normal" coal, i.e., a coal containing a standard ash and moisture content typical for the particular class of coal.

(d) *Waste Heat Recovery*

The recovery of as much as possible of the heat in the waste gases in the form of steam is a practical contribution towards fuel economy. If a considerable quantity of air infiltrates into the main waste-gas flue it passes through the

boiler and overloads the fan, causing the turbine or steam engine to use more steam. To prevent this it is beneficial to make periodical tests of the waste gases for carbon dioxide content at the boiler inlet, as compared with the carbon dioxide content at the waste-gas flue near the setting. If there is a big difference the source of air leakage should be traced by means of an Orsat apparatus.

To avoid damage to the waste-heat boiler tube plate it is necessary to limit the inlet temperature to the boiler, and sometimes cold air has to be mixed with the waste gases at a suitable distance from the boiler inlet. The provision of a recording pyrometer at the boiler inlet enables the men working the plant to admit the right amount of air for safety of the tube plate. At the outlet end of the boiler a thermometer is necessary for two reasons:

(i) If the temperature rises it indicates the need for tube cleaning. Dirty tubes mean loss of steam on two counts; by reason of the higher outlet temperature of the waste gases and by reason of the extra amount of fan power required to pull the gases through the tubes.

(ii) If the temperature falls below the prescribed figure, usually about 230°C., there is danger of corrosion of fan outlet ducts due to condensation. The temperature must be brought up to the prescribed figure by plugging a number of the upper tubes.

As reciprocating feed pumps are usually employed with waste-heat boilers, the measurement of feed water quantity by meter causes certain difficulties in obtaining accurate figures. A test tank for water feed is a useful addition if steam-raising data are required. An important factor in the efficient generation of steam—especially in waste-heat boilers of the fire-tube type—is the use of feed water of suitable quality. To ensure this, a water-softening plant is usually necessary, the routine testing of which should be regarded as an essential item in retort house control.

The lagging of boilers and steam services should be maintained in good condition. The loss of heat per annum from 1 sq.ft. of unlagged steam pipe is sufficient to carbonize 2 tons of coal.

Provision of 24-hr. Control

An adequate number of instruments, particularly of the recording type, can provide a valuable guide over the period of 24 hours as to the efficiency of carbonization and as to the way in which the men are performing their various duties, particularly if no constant night supervision is available. Regularity in performance of duties, fire-cleaning, charging and discharging of retorts, and so on, assist in maintaining maximum efficiency of operation.

The Value of a Test Stream

On large installations, which may comprise a number of benches of retorts of different ages and design, the need for scientific control is of great importance. Without special care there is a tendency for the results of old retorts to mask the performance of new ones. In such cases there is much to be said for the procedure which has been adopted in some Works of providing a separate testing stream whereby a group of retorts can be tested and tuned up whilst the rest of the retorts are connected to the main purification stream.

On a number of Works, arrangements have been made whereby one or two retorts can be isolated as a test unit, with its separate purification system and measuring apparatus. Such a test plant is invaluable, particularly where it is desired to check the comparative value of different coals or to investigate changes in operating conditions.

Instruments

Emphasis has already been laid in this Paper on the fact that scientific control does not depend upon the installation of a large number of complicated instruments. It may be of interest, therefore, to summarize the list of instruments mentioned in the foregoing notes:

Recording Pressure Gauge for producer gas main.
Portable Pressure Indicating Gauge.
Draught Indicator or Recorder for main waste-gas flue.
Recording Pressure Gauge at inlet retort house governor.
Orsat Gas Analysis Apparatus.
Complete Gas Analysis Apparatus (if possible).
Disappearing Filament Pyrometer.
Recording Pyrometer for inlet waste-heat boiler.
Thermometer at outlet waste-heat boiler.
Steam Gauges on various services to retorts and producers.

This list does not include the apparatus required for weighing the coal and producer fuel, measuring the volume of gas made and determining its calorific value.

Conclusion

In conclusion, it may be worth recording that the acceptance of the principles of scientific control in the retort house has a secondary implication which may have far-reaching effects. Instruments can only work satisfactorily when reasonable conditions are provided in the form of ventilation, light, coolness and absence of dust. Has sufficient attention yet been generally given to the provision of these amenities for the workers in the retort house? Conditions have much improved in recent years, but the tendency to require maximum outputs of gas per cu.ft. of retort house space has limited the progress. Co-operation between gas engineer and plant designer could lead to greater improvement. Such amenities are difficult to assess in money, and are an ethical rather than a commercial matter which the plant designer cannot decide alone.

The ideal which should be sought is that coal carbonization should be carried out with maximum efficiency and with the minimum of manual labour, under satisfactory working conditions for the retort house worker. With this ideal in his mind each gas engineer can review his works practice and see whether any improvement can be effected.

PROPOSED FUEL RATIONING SCHEME

THE following is from an Annex to a White Paper issued by the Government on June 3. It sets out the proposed rationing scheme, which has been postponed, but is to be prepared and held in reserve so that it may be put into operation at short notice whenever necessary.

Fuel Rationing Scheme

(1) There will be a fuel ration for each household and, in addition, a fuel ration for each person, including children.

(2) The ration will be fixed in cwt. of coal. But a consumer can take part of his ration in other fuels—coke, gas, electricity, or paraffin. These will be interchangeable according to a points system on the basis that 1 cwt. of coal or coke equals 5 therms of gas or 100 units of electricity or 2 gallons of paraffin.

(3) The household ration will be fixed for each household by an assessment of present needs according to a simple scale as shown below. The ration will depend on—

(*a*) The locality of the household. For climatic reasons a higher scale will be given for Scotland and the North of England than for the Midlands, which in turn will have a higher scale than London and the South.

(*b*) The number of habitable rooms in the house (excluding sculleries, bathrooms, &c.).

(*c*) In the case of houses with more than seven habitable rooms, the number of residents.

The making of these assessments will be a very simple matter, involving no exercise of judgment by any official, but only the tabulation of facts. 85% of all households contain seven habitable rooms or less.

(4) The personal ration will be the same for all persons whether young or old. It will be 7½ cwt. a year per head. Thus a family of four persons will be entitled to a total personal ration of 1½ tons in addition to their household ration.

(5) A supplementary ration may also be given for special needs such as sickness necessitating additional fuel, bomb damage, the use of a house for business premises, &c. These supplementary rations will be granted by the Local Fuel Overseer. They are the only part of the ration which requires the exercise of discretion by any official, and even this will be largely reduced by the issue of simple rules dealing with the most common cases.

(6) The question of miners' coal will be specially dealt with, after full consultation with representatives of miners and mine owners.

(7) Any householder applying for a supplementary ration, who is

not satisfied with the decision of the Local Fuel Overseer, will have a right of appeal.

[Paragraphs 8 and 9 deal with dates of rationing, which have been postponed.]

(10) During any half-year, electricity consumption in any household must not exceed the consumption in the corresponding six months of the previous year, except with the consent of the Local Fuel Overseer.

(11) Any small excess of consumption of electricity or gas over the amounts permitted will be reported to the Local Fuel Overseer and carried forward and deducted from the ration in the next period. Any larger excess may be subject, on the initiative of the Local Fuel Overseer, to prosecution and a maximum fine of, say, ten times the price per unit of the excess. In cases of flagrant and deliberate excess, supplies will be cut off, if so ordered by the Court. It is not anticipated that such cases will be at all common.

(12) Establishments—*i.e.*, buildings other than domestic or industrial premises, *viz.*, schools, hospitals, hotels, business offices, shops, restaurants and places of entertainment, &c.—will be rationed on the basis of their consumption of fuel in a preceding period. The amount of the reduction will be determined by the Local Fuel Overseer with a right of appeal. In exceptional circumstances an increase may be allowed.

In addition to rationing, establishments will be subject to restrictions directed to prevent extravagant or unnecessary use of heat and light.

(13) Fuel rationing can only operate fairly and effectively by means of coupons, but steps will be taken to minimize any inconvenience which the use of these may cause. Each householder will have a ration book from which coupons will be detached. Further, each person receives a clothing ration book by June 1 and may use any of the 15 spare coupons which it contains to purchase ½ cwt. of coal or the equivalent of other fuels. This is the personal ration.

Coupons will only be required to be handed over for gas and electricity when payment is made by cash or cheque. For solid fuel coupons may, if preferred, be deposited with the order. But otherwise coupons will always go with the money. This will remove many difficulties. Thus meter readers will only need to collect coupons when they collect cash. All alternative arrangements which have been suggested are more cumbrous and more open to evasion and fraud.

In order to save labour for the gas and electricity companies arrangements should be made whereby the same person reads both the gas and electricity meters. Such an arrangement is already in force as between the Gas Light and Coke Company and the County of London Electric Supply Company.

(14) It is estimated that a permanent staff required throughout the country for the administration of fuel rationing will mean, on an average, an addition of two to three persons for each of the 1,600 Local Fuel Offices. That is to say, an addition of some 4,000 in all, including headquarters staff.

Further, for a period of six week to two months, some 8,000 temporary clerks will be required at the Local Fuel Offices to make assessments for household rations and to issue the household ration books.

(15) The following is provisional scale of household rations expressed in terms of coal, to which must be added both the personal rations of all members of the household under (4) and any supplementary rations under (5).

Number of rooms.	Scotland and North of England.	Midlands.	South of England.
	Cwt. of coal per year.		
1	40	30	25
2	45	35	30
3	55	45	35
4	60	50	40
5	70	55	45
6	75	60	50
7	85	70	55

Thus the total ration for a five roomed house with four people, each of whom is entitled to 7½ cwt. a year as personal ration, would be 5 tons in the North, 4½ tons in the Midlands, 3¾ tons in the South. Any supplementary ration would be additional to these figures.

The larger houses with eight rooms or more will not receive a larger ration than the seven roomed houses, unless they have sufficient residents to justify it, or there are other special circumstances. The general rule is that an extra room over seven should only count if there are at least four residents, ever eight if there are at least five, and so on. The additional amount allowed per room, subject to these conditions for larger houses, will be 15 cwt. in Scotland and the North, 12½ cwt. in the Midlands, and 10 cwt. in the South.

(16) If any householder satisfies the Local Fuel Overseer that his previous consumption was not unduly high, it will not be cut by more than 33⅓%.

(17) These scales will, it is estimated, produce a total saving of 10 million tons of coal in a full year. They will involve no reduction for about a quarter of the total households. The remaining three-quarters will receive rations less than their present consumption.

BOMBAY GAS COMPANY, LTD.

THE Annual Ordinary General Meeting of the Bombay Gas Company, Ltd., was held at the London Offices of the Company, Gresham House, Old Broad Street, London, E.C. 2, on Wednesday, June 3, Mr. STANLEY H. JONES (Chairman of the Directors) presiding.

The SECRETARY (Mr. E. Comber) read the notice convening the meeting, together with the Auditors' Reports. The Directors' Report and the Accounts of the Company for the year ended Dec. 31, 1941, were taken as read.

The CHAIRMAN, in moving the adoption of the Reports and Accounts, referred to the loss which the Company sustained by the death of Mr. Hugh Henderson Macleod, late Chairman, on Jan. 26 this year. He rendered to the Company valuable services as a Director for 19 years, and only occupied the Chair for ten months.

Continuing, the CHAIRMAN said: The Directors have appointed Mr. Basil Murton Gill to fill the vacancy on the Directorate caused by Mr. Macleod's death. I now turn to the Accounts. The sale of gas shows an increase of 18.1%. The capital costs per million cu.ft. of gas sold are only £513—a satisfactory figure—and I may say here that the issued capital of this Company is as low as £330 per million cu.ft.

The year has not been without its difficulties and anxieties. Coal supplies have been a source of worry owing to the shortage of railway wagons, but through the efforts of Mr. Lane, who personally went to Calcutta for the purpose of interviewing the appropriate authorities, the situation has improved considerably. The cost of coal is considerably higher than usual. The revenue items have all provided increases. The sale of gas shows £28,626 more while residuals have provided £8,909 more, and the total increase in revenue amounts to £38,399.

On the expenditure side the increase in revenue has been swallowed up mainly by increases in cost of coal, wages, and depreciation; 8,414 tons more coal have been carbonized, costing an extra £14,475. The increase in the make of gas, however, was 142,000,000 cu.ft. Wages have increased generally, which needs no explanation, as this upward trend seems to be general among all industries in allied countries. Repair and renewal of cookers and water heaters have cost £7,377 more than last year due entirely to depreciation. The working balance of £79,768 is a record for the Company and is carried to the net revenue account.

There are only two items in this account calling for comment. They are income tax, which is £19,464 more and is not surprising in view of the increase in the rates of income tax and excess profits tax. The other feature is the allocation of £5,000 to the renewal fund which the Board deem necessary in view of the expenditure to be incurred in the near future in resheeting two of the gasholders and in providing new and additional plant.

As to the balance-sheet, one item on the liability side calls for explanation—viz.: "Sundry Tradesmen," which stands at £37,357. This item contains an amount of £18,587 in respect of Indian income tax which remained unpaid at Dec. 31, 1941, but has since been paid. I understand that the assessment had not been agreed to at that time. On the asset side of the balance sheet, cash in hand and investments show an increase of £58,764, but the increase in sundry creditors of £26,000 must be deducted from this sum, leaving a surplus over last year of £32,764, against which must be placed the liability for income tax and excess profits tax which when agreed with the inspector will almost extinguish this surplus.

Our late Chairman mentioned last year that a trust was being formed for the provident fund, and we had hopes of completing the negotiations which have been taking place over a period of three years for the creation of a "recognized" trust necessitated by Indian legislation, but circumstances over which we have no control have delayed the matter. It is probable, however, that the matter will be completed this year. The balance available as per the net revenue account is £63,487 11s. 10d., out of which the Directors recommend a final dividend of 4½% less income tax at 5s. in the £, leaving a sum of £49,987 11s. 10d. to be carried forward.

I now move:

"That the Report of the Directors and the Auditors' Report for the year ended Dec. 31, 1941, presented to the meeting, be, and the same are hereby received, approved, and adopted."

Mr. A. M. PADDON (Deputy-Chairman) seconded the resolution, which was carried unanimously.

The CHAIRMAN then moved:

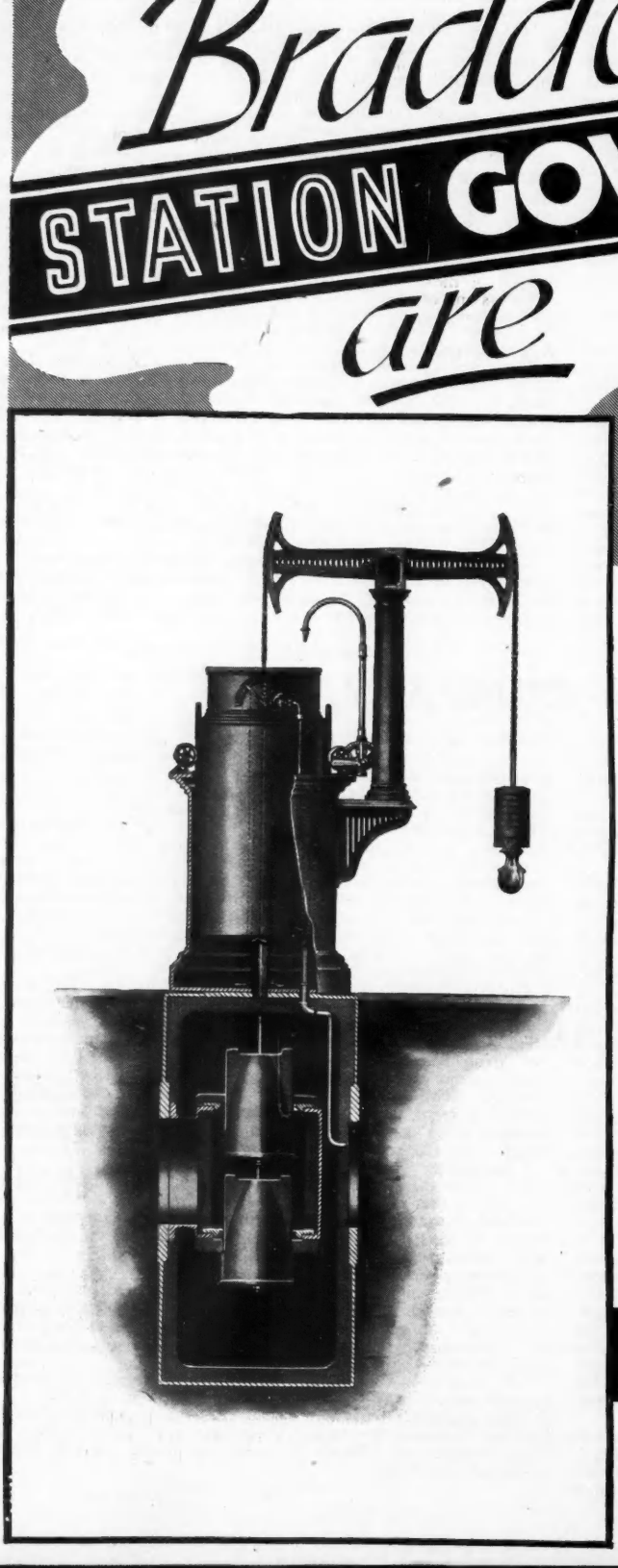
"That a final dividend for the year ended Dec. 31, 1941, of 4½% (less income tax at the rate of 5s. in the £) be now declared payable on and after June 13, 1942, making with the interim dividend of 3½% (less income tax) a dividend of 8% (less income tax) for the year."

Mr. BASIL M. GILL seconded, and the resolution was carried unanimously.

The CHAIRMAN: I have very much pleasure in proposing: "That the retiring Directors, Mr. Arthur M. Paddon and Mr. Basil M. Gill, being eligible and offering themselves for re-election, be hereby re-elected accordingly."

(*Concluded on p. 423*)

Braddock's STATION GOVERNORS are Best



SALIENT FEATURES.

EXTREME SENSITIVENESS

KNIFE EDGE BEARINGS

NO FLOATS TO BECOME WATERLOGGED

COMPACTNESS AND REQUIRING SMALL FLOOR SPACE

ALTERNATIVE METHODS OF LOADING BY WEIGHTS OR WATER

We make

TOTALLY ENCLOSED PRESSURE LOADED GOVERNORS.

J. & J. BRADDOCK

(BRANCH OF METERS LTD.)

LONDON - - Telephone No.: **Mitcham 2121**
OLDHAM - - ,, ,, **MAin 3815/6/7**
WOLVERHAMPTON ,, ,, **Wolver. 23189**

REPLANNING GAS DISTRIBUTION*

By G. G. WARNE,

Assistant Distributing Engineer, Portsmouth and Gosport Gas Company

IN all cities and towns where bombing has occurred on an extensive scale, a great amount of new mains and service work will have to be carried out. It is important, however, that early decisions should be made which involve any fundamental principles to be followed, since the reconstruction of mains systems must commence with the establishment of peace.

The standardization of calorific value is a major question now under consideration by the Industry, and although there appears to be a very widely varying opinion between many well-known engineers as to the effect of a change in calorific value upon the capacity of a distributing system, the possibility of a general change to a lower standard of calorific value cannot be completely ignored. This point will be of some importance in cases where existing mains systems are being operated at their maximum or near maximum capacities. Changes in the methods of operating existing mains systems, coupled with some minor alterations on the districts concerned, will often result in greatly improved conditions of supply. In addition to the district work involved, the position of the works as regards plant and power must also affect the considerations.

It may yet be found that service capacity is most seriously affected by the lowering of the calorific value, and supplies to high heat capacity gas appliances may have to be enlarged. Main capacities can be increased by pressure increases, but in services and carcass pipes the raising of capacities by pressure increases is impracticable. No increase in main and service capacity will result from a reduction in calorific values, and a decision on future standards would provide a valuable guide to distributing engineers designing the new supply systems. Replanning of the mains systems in many areas and sections of the country's cities will naturally follow the large scale reconstruction of those cities.

Local and Regional Planning

It appears highly probable that distributing engineers will be facing two distinct aspects of gas supply in the future, necessitating independent consideration, which will be created by the different requirements of local and regional supplies. Distinctive designs of mains systems can be developed locally, but in the wider sphere of regional supply, a fixed plan should be established in which it can be envisaged that the only variation will be in the diameter of the pipe lines laid.

At least two methods of laying underground pipe lines must be carefully considered before any new work is undertaken for the establishment of the services and supplies demanded by a modern community. The past practice of burying pipes and cables in the roadways and footways might well be superseded in our new cities by a system of subways and culverts constructed to accommodate all pipelines. It is possible to visualize a culvert system built as a centre section into the grass verges and tree, shrub, or flower borders between the footways and roadways of the future thoroughfares. Sectional reinforced concrete blocks could be utilized for the culvert work, and by the use of tinted surface blocks chosen to suit variations in decorative designs; the whole effect produced would be one of complete harmony. All service control valves and governors should be established immediately outside the culverts but inside the grass verges, thus leaving the footways completely clear and free from interference during normal maintenance work. Coupled with modern flexible main joints and flexible service connexions, the advantages of such a scheme are so obvious that they require no other mention than the claim that broken mains would only figure in the past history of gas supply.

The likelihood of continuous or periodical water flooding of a culvert system must be provided for, and this appears to offer easy solution if the normal storm drains are built into the bottom centre of, and with trap connexions from, the system. Competent estimating engineers should give figures for the probable costs of such a scheme, and if these prove to be acceptable, no hesitation should occur in commencing the system during reconstruction and providing for its extension as and when conditions demand.

Local authorities, utility companies, and government departments are all very much concerned in any form of planning for underground supply lines, and, failing a culvert system, questions concerning position, depth, and manhole construction are of major importance. One must admit that the principle of "first in" persists to-day, and one supply line with sectional inspection boxes in a footway may prevent the laying, or make very difficult, the laying of other lines. Again, in some recent road works, sewers and storm drains have been laid in footways. Such procedure hardly appears necessary or beneficial, since connexions to and maintenance of sewers and storm drains are far less than is the case with Utility Companies, who, with their many openings and connexions, would benefit much more from the use of the footway. This question may, of course, be completely answered if, during reconstruction, footways and verges are wide enough to accommodate all.

The main point then will be a limitation upon the size of any manhole, inspection chamber or box, to be constructed in the footway, and this can be achieved if sections of the available ground space are allocated to the bodies concerned, either by local authority or, preferably, by national jurisdiction. For the Gas Industry, an important point for settlement is the position of the gas supply line relative to the building line, which, in view of the possibility of escaping gas, should be as distant as possible.

The time now affords excellent opportunity for the reconsideration of the many and varied types of pipes and joints which have in recent years swamped the country, and an effort should be made towards some standardization, a feature of which might well be a universal dimensional standard for pipes and specials. Manufacturers producing materials for home and export trade use both the English and metric systems of measurement and, in this country alone, pipes of all diameters and of 9, 12, 15, 16, and 18 feet lengths are manufactured. Even a standard of yards is not adhered to. It is therefore suggested that, subject to a better standard, the metric system, which is acknowledged by many as superior to the English system of measurement, might be adopted in future. Simplification in the whole range of users' requirements would help manufacturers, result in production economies, and ultimately reduce prices to the benefit of all.

Scientifically and mechanically designed joints for spun iron pipes are available in several forms; with the present experience is it advised that they might replace successfully the use of the run-lead joint and be adopted generally? The older school of thought may yet hesitate to make a complete change from the old run-lead joint, which has for its main recommendation the fact that "it has stood the test of time for a hundred years." It may be, however, that the new joints will stand for two hundred years and without the recurrence of drawn and leaking joints. Considerations of the working pressures on pipelines are always a determining factor in the choice of material and type of joint to be utilized for any practical work. The new joints provide the requirements of low, medium, and high pressure conditions, up to a working pressure of 25 lb. per sq.in., thereby achieving considerable standardization throughout the areas where combinations of these pressure systems are utilized, and, in the opinions of some, obviate the necessity of using steel with its several disadvantages. The mechanically made joints provide practical and economic advantages of which the quality of flexibility is outstanding, and it has been found that the stresses set up during severe spells of frost are considerably compensated for, and experience has so far produced no report of failure on pipelines using the new types of joint.

Modern design of roadways and housing estates includes, in many instances, roundabouts, curved areas and circular ended cul-de-sacs, and the new flexible joints provide a better and simpler means of laying a "good" pipeline as against a "ragged" one.

Undoubtedly many undertakings would have been spared much distress during the heavy raids on our cities if greater valve control had been available. From the aspect of future war, then, valves must be installed on all lines of mains during the coming reconstruction. The extra charge per yard of main laid will not be great, and there do not appear to be many reasons why valves should not be widely used. If the use of valves is to become general, then some greater standardization in manufacture should be established.

The widespread flooding of mains has made it evident that a small re-design is called for in the new syphons. Syphons of all sizes should be fitted with larger suction pipes.

Internal rust formations are a constant source of trouble and can be expected to increase still further, due to the very considerable flooding of mains as a result of enemy action. With the probable installation of more main valves, service control valves, and governors, the control of rust will become increasingly vital if such apparatus is to be maintained in good order.

The best and surest method of settling internal rust formation would be by the use of some scientifically prepared internal coating on the pipes.

Services

The range of service sizes should be generally reduced. Eliminate the ¾ in. and 1¼ in. sizes and work the range of 1 in., 1½ in., and 2 in., each size, for practical purposes, being double the capacity of the other. This will afford the advantage of a greater reserve of potential throughput which may be of great value in the future to meet either a general reduction in calorific value and/or the development of a greater household gas load. The principle of building in wider spaces will necessitate longer services. These will have to be of a larger initial size and, with the possibility in some cities of considerable flat development, 1½ in. and 2 in. will be the general sizes to be used.

Future scientific design of appliances may call for the more stringent

* Abstract of paper to the London and Southern District Junior Gas Association, May 29.

PAINT WITHOUT PERMITS!

for urgent maintenance work

IF **Engineering and Factory Plants and Public Utility Services** are to continue to function in the production and distribution of goods vital to the National War Effort, their maintenance in runnning order is essential. To ensure that maintenance is a problem to the Government Departments concerned.

BECAUSE The ingredients of many protective paints have to be imported, and are in very short supply.

BUT We manufacture a Steel Grey Paint (familiar to engineers as "Ferrodor" Paint) which is made of **micaceous Iron Oxide**—a pigment well known for its protective value on metal or wood structural work.

AND **This pigment is mined in this country; its use does not involve shipping space and it is free of Government Control.**

THEREFORE Although we are heavily engaged on direct and indirect Government Contracts, we are prepared at present to release for urgent maintenance work **"Ferrodor" Paint for the use of which no Government Licence is needed.**

This paint is offered in connexion with our technically devised process of **"Selective Renovation,"** under which treatment effective maintenance is achieved **with maximum economy of labour and material.** Advice on our Selective Renovation Treatment is at the disposal of Maintenance Engineers.

Issued by

GRIFFITHS BROS. & CO. London LTD.

PAINT, ENAMEL AND VARNISH SPECIALISTS

MACKS ROAD, BERMONDSEY, S.E.16

control of gas pressure necessitating governing of all services against the differences which occur between peak load and off-load periods. Such a method, coupled with accurately balanced carcass pipes, might well dispose of the present tendency of governing independent appliances and prove more economical. A simple, efficient, and serviceable governor could be manufactured for this purpose, the control valve on all supplies would become a necessary feature, and the ideal of gas supply at equal and constant pressure throughout the whole area would be reached.

Access to buildings should be provided for all underground services by means of some form of built-in ducts, and such provision will become an essential feature during reconstruction if, as is probable, all properties include some form of reinforced basement structure.

The accommodation provided in many houses for gas and electricity meters, particularly on some recent building estates, has been totally inadequate. The independent housing of the gas and electricity meters has much to commend itself.

Discussion

Mr. **G. le B. Diamond** (Rochester), as President, extended the greetings of the Southern Association of Gas Engineers and Managers, remarking in regard to the Paper that, while a great deal was to be said in favour of the culvert system, it was obviously expensive, and for success two ducts, one on each side of the roadway, would be required. As to flexible joints he could confirm their strength in use; he had had much experience of them and they had given no trouble.

Mr. **P. Richbell** (Croydon) said that, while the method of constructing subways and culverts to accommodate all pipelines might be ideal, the difficulty in getting other undertakings interested in laying pipelines in public highways to agree to bear part of the cost of the construction of the culverts would be almost insurmountable. This apart from the actual cost of the subways. In reply to which **the Author** maintained that they must achieve agreement about cost, and if the system he advocated could be established the cost of main-laying would be decreased and there would be many ancillary savings.

In regard to the Author's remarks about standardization of pipes and specials, Mr. **Richbell** called attention to the fact that the Pipes Committee of The Institution of Gas Engineers, in co-operation with the B.S.I., had standardized dimensions and weights of specials, the only matter outstanding being the actual weights of the specials.

He presumed the Author was referring to various types of joints which had been placed on the market by manufacturers for which the jointing medium was generally a rubber ring. In these cases, until a joint of outstanding merit had been produced, each manufacturer would endeavour to sell his particular type of joint, irrespective of the Author's ideal of standardization. He felt it was desirable to have various lengths of pipes from the manufacturers, as one was able to use the pipes suitable to the particular road in which they had to be laid. He agreed that it would be of considerable assistance if it could be arranged between gas and water undertakings that they would use even and odd sizes of pipes respectively. Distribution engineers would have been spared a good deal of anxiety during air raids if the districts had been fully valved. He mentioned that in his district they had just completed the isolation of all trunk mains from 12 in. upwards and a certain number of 10 in. mains in congested areas. The trunk mains were also divided into sections not exceeding 1,000 yards. There was, however, no advantage in using valves for the distribution systems under peacetime conditions, except perhaps to segregate the district into areas controlled by the various works and district governors, and also for bridge and railway crossings.

He agreed with the Author that ¾ in. services should be eliminated. It had been the practice of his company for the last 25 years to relay all ¾ in. services with a minimum of 1 in. services. He did not, however, agree that it would be desirable to eliminate the 1¼ in. size.

The Author had raised a very interesting point with regard to the question of governing, and he would refer to the system being adopted at Croydon and which would have been completed but for the intervention of war, in the central portion of the Company's area of supply. They carried out experiments on the "Regulos" normally attached to cookers and found that they were not materially affected over a range of 1½ in. in pressure. They considered that the control of pressures on the district could be carried out by the installation of a number of governors at suitable points, thus eliminating the necessity for the installation of governors on each service. These governors were controlled by a clockwork mechanism.

Among other views put forward by further speakers, comment, both favourable and adverse, was made on the use of asbestos pipe, and there was strong advocacy of the system of individual appliance governing. It was also suggested that experiment should be made with copper service pipe, and the possibilities of a composite wrought-iron barrel with internal copper tube were mentioned. In regard to new systems of distribution, such as the building of culverts, it was argued that a thoroughly bad way of approach to the problem was to anticipate and magnify difficulties, and that in any case the present system of four or five different utilities laying their pipes and taking them up again haphazard was neither more nor less than lunatic. Again, it was put forward that for new property in the new era, the capacity of mains would have to be thought of in terms of annual domestic consumptions of the individual order of 300 therms.

PRODUCER GAS FOR ROAD TRANSPORT

(*Continued from p. 329*)

The cross-draught producer can cope with different types of fuels—*e.g.*, anthracite, low-temperature coke, &c.—and gives flexible service. The high fire-bed temperature gives a gas high in CO and low in CO_2. While the use of wet-blast certainly gives a higher calorific value gas than does dry-blast, and may be necessary with high-temperature coke, it suffers from certain disadvantages.

On the whole, dry-blast is preferred to wet-blast for passenger service vehicle operation.

The gas must be adequately cooled before reaching the filters and before reaching the engine.

A wet washer is recommended, as cylinder wear results obtained with wet washers are superior to those obtained with dry filters. Water traps should be provided between the washer and the mixing valve. The water in the washers should be changed as frequently as possible, at least once and preferably twice a day.

The mixing valve should be arranged so that cool air enters the valve. A hand lever for adjusting the gas/air ratio should be provided in the driver's cab, and this should be capable of fine adjustment, since the ratio is somewhat critical.

The compression ratio of a petrol engine should be raised to about 8 : 1 provided the engine will stand it; that of a diesel engine should be reduced to about 11 : 1. Provision should be made for upper cylinder lubrication.

Plugs can be the ordinary type, and it is advisable to clean the insulators about every 250 miles. It is hoped that plug-makers will develop a design, possibly with sharp corners to the insulators, which will give longer runs between cleaning.

On passenger service vehicles provision of a tank of one gallon capacity is adequate to meet all starting demands for petrol. The petrol carburetter should not be controlled from the driver's cab. Provision of a larger petrol tank will be necessary on long-distance vehicles.

Of the fuels available, anthracite, preferably treated with soda, seems to be the most suitable, especially from the point of view of bulk density. Bulk density becomes an important factor for vehicles having a high rate of fuel consumption, and since it is unlikely that there will be sufficient anthracite available for a large scale change-over to producer gas, it is suggested that the use of anthracite should be reserved for vehicles covering more than about 100 miles a day. Fuels of lower bulk density can be used with advantage in vehicles where one hopper-full will meet a day's demands.

For some purposes a trailer is an advantage or even a necessity, whereas in other cases the producer unit can conveniently be arranged on the vehicle. In the latter case the fitting should be made so that easy removal is possible in case of breakdown. Filters which can fit below the floor of the vehicle are convenient.

A regular servicing routine should be drawn up and strictly observed.

Although the driving of a producer-gas vehicle is no more difficult than that of a normal vehicle, it calls for a somewhat different technique. It is essential that the engine revolutions should be maintained. This means that an early gear change on hills is necessary in order to bring the fire-bed up to the requisite temperature.

Portable Producers for Special Purposes

There is a wide field of possible application of portable gas producers in addition to the use for essential transport purposes and in which further savings of imported liquid fuels can be made.

Many Admiralty, Army and Air Force vehicles, for example, could well be powered by producer-gas engines, converted from existing engines, for use in this country; it is suggested that the appropriate Ministries investigate the possibility, especially for some of the home Services vehicles operating on routine supply, which could use producer-gas to the national advantage.

Portable gas-producers can also be applied to liquid-fuel driven engines used in agriculture; to cranes and excavators; to compressors; to barges; to tractors—in fact, to many units now powered by petrol or diesel engines.

A further use for this type of producer is in connexion with stationary engines and as a stand-by for firing small oil or gas fired furnaces. The gas-cleaning problem is simpler in such cases than on a completely portable plant.

Although the use of portable gas-producers has reached a stage where operators of vehicles can convert with confidence to this form of engine fuel, the field for further investigation is still open. Points which require further work and investigation include *the development of a readily available fuel, the problem of sulphur in the fuel, means of increasing the calorific value of the gases, and the development of a producer to use a wider range of fuels.*

Some of the items mentioned above are points for longer term research than will allow practical availability of results in the near future. Nevertheless, it is important that the work should be undertaken, for the difficulty which is being experienced now in obtaining liquid fuels from abroad may not cease when hostilities cease, and for

(*Concluded on p. 423*)

For every size of works and every class of coal...

WEST'S

CARBONIZING PLANTS

GLOVER-WEST VERTICALS

WESTVERTICAL CHAMBERS

440 carbonizing plants have been built or are under construction by West's in 24 countries. Working results from a wide variety of gas coals have established the high efficiency and adaptability of the West systems.

WEST'S

GAS IMPROVEMENT CO · LTD ·

MILES PLATTING MANCHESTER 10

TELEPHONE—COLLYHURST 2961-2-3-4 5 TELEGRAMS—STOKER, MANCHESTER.

LONDON OFFICE TEMPORARY ADDRESS—BATH ROAD · HARMONDSWORTH · WEST DRAYTON · MIDDLESEX TEL.—WEST DRAYTON 2288-9.

Gas Products Prices

The London Market June 8.

The only change in the prices of Coal Tar Products in the London Market refers to 95/160 Solvent Naphtha, which is now about 2s. 3d. to 2s. 7d. per gallon.

The Provinces June 8.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 10d., pure, 2s. 5d. (controlled by the Control of Toluene No. 2 Order, July 3, 1941, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 1s. to 1s. 4d. according to quality. Solvent naphtha, naked, North, 2s. 2d. to 2s. 6d. Heavy naphtha, North, 1s. 10d. to 1s. 11d. Carbolic acid, 60's, controlled by the Coal Tar Acids Prices (Inland) Order, 1942, operative from May 1. Naphthalene, controlled by the Naphthalene prices (Inland) Order, 1942, dated April 15, 1942, and operative from May 1) 1942, £19 to £19 10s.—bags free. Anthracene, controlled by the Anthracene Prices (Inland, Order, 1942, operative from May 1. Filtered heavy oil (min. gr. 1,080), 7½d. to 8d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland June 6.

A steady throughput is maintained. Refined tar controlled. Value about 4½d. per gallon *ex* Works, naked. Creosote oil: Specification oil, 6½d. to 6¾d.; low gravity, 7d. to 7½d.; neutral oil, 6½d. to 6¾d. per gallon; all *ex* Works in bulk. Cresylic acid is scarce for ordinary purposes. Prices from 3s. 6d. to 5s. per gallon, *ex* Works, naked. Crude naphtha: 6½d. to 7d. Solvent naphtha; 90/160 grade, 2s. to 2s. 3d. and 90/190 Heavy Naphtha, 1s. 9d. to 2s. per gallon. Pyridine: 90/160 grade, 13s. and 90/140 grade, 15s. per gallon.

Gas Stocks and Shares

The general outlook on the Stock Exchange was distinctly brighter last week, but the volume of business continued small. A scarcity of supplies led to a large number of improvements and this was particularly noticeable in the Gas Market. In this section, except in the case of a few leading stocks, the number of recorded transactions was not up to average, but it will be seen that many quotations were marked up and there were no reductions. In the Official List, Watford ordinary made a sharp rise of 10 points and South Metropolitan ordinary gained 6. Imperial Continental again improved. Cambridge 7% Cons. "B" made a spectacular rise of 27½ in the Supplementary List.

The following quotations were changed during the week:

SUPPLEMENTARY LIST

Cambridge 7 p.c. Cons. "B"	130—140	+27½
Uxbridge 5 p.c. Deb.	105—110	+2

PROVINCIAL EXCHANGES

Derby	113—118	+1
Ditto 4 p.c. Deb.	85—90	+10
Newcastle 4 p.c. Pref.	92½—93½	+1
Ditto 3½ p.c. Red. Deb.	88—90	+1½
Sunderland Ord.	111½—112½	+½

OFFICIAL LIST

Gas Light Units	13/3—14/3	+-/3d.
Ditto 4 p.c. Pref.	64—69	+2
Ditto 3 p.c. Deb. (*x.d.*)	83—86	June 1
Ditto 5 p.c. Red. Deb. (*x.d.*)	104—108	"
Ditto 4½ p.c. Red. Deb. (*x.d.*)	102—106	"
Imperial Continental	60—65	+3
South Metropolitan Ord.	56—61	+6
Ditto 6 p.c. Pref.	77—82	+1
Ditto 5 p.c. Red. Deb.	101—106	+1
South Suburban Ord.	79—84	+4
Ditto 5 p.c. Pref.	95—100	+2
Ditto 4 p.c. Pref.	77—82	+2
Ditto 5 p.c. Deb.	107—112	+2
Tottenham 5 p.c. Pref.	95—100	+5
Uxbridge	100—105	+5
Wandsworth Cons.	80—85	+2
Ditto 4 p.c. Pref.	75—80	+1
Ditto 5 p.c. Deb.	107—112	+2
Ditto 4 p.c. Deb.	90—95	+5
Watford Ord.	97—102	+10

BOMBAY GAS COMPANY, LTD.—Concluded from p. 417.

Mr. BERTRAM W. ELLIS seconded and the resolution was carried unanimously. Mr. Paddon and Mr. Gill briefly returned thanks.

Mr. H. F. HILLS proposed the re-appointment of Mr. Alfred Morland, F.C.A., and Mr. F. J. Bradfield, F.C.I.S., as Auditors for the ensuing year at the same remuneration as hitherto.

Mr. S. F. FIELD seconded, and the resolution was carried unanimously, Mr. Bradfield returning thanks on behalf of Mr. Morland and himself.

The CHAIRMAN: The next matter is a very pleasant one, and that is I wish on behalf of my colleagues, and I am sure, on behalf of you gentlemen, to propose a hearty vote of thanks to the staffs of the Company, both in London and in India. Dealing with London first, we are very well served by our Secretary, Mr. E. Comber, his Assistant, Mr. M. E. Bush, and by Miss Cox. They always provide us with everything which is necessary with the greatest promptitude. Both Mr. Comber and Mr. Bush are old in the service and as the years go on their work gets even better. They carry the experience of the past, and that is worth a great deal. With regard to Bombay we are fortunate in having in Mr. W. T. Lane, our General Manager and Engineer, an official who has been, I think, over 40 years in the Company's service.

We are grateful, too, to Mr. L. W. Boulter, and to Mr. W. E. Gladstone.

Mr. G. EVETTS seconded the vote of thanks.

The SECRETARY replied on behalf of the whole of the staffs.

Mr. F. J. BRADFIELD proposed a vote of thanks to the Chairman, and Mr. F. J. HILLS, seconded.

The CHAIRMAN briefly replied.

PRODUCER GAS FOR ROAD TRANSPORT.—Concluded from p. 421.

economic reasons this country may well have to rely for some years after the war largely on home-produced road transport fuels. Until such time as petrol from coal has reached a greater output, or until a successful coal-dust engine has been developed, the reliance will have to be placed on producer gas. Accordingly, it may be desirable to manufacture engines designed specifically to use producer gas, and to design the layout of vehicles to house conveniently the producer unit. With this in view, the engineers of Tilling's Association have evolved a design for a producer-gas omnibus, having in mind the assurance of the Ministry of Transport that if a satisfactory design of vehicle with the producer plant built-in can be elaborated, a chassis overall length of 30 ft. will be allowed (a concession of 2 ft. 6 in. length additional to that permitted by existing regulations).

Two such vehicles are being made; each will be a single-deck omnibus of 35 seats and an overall length of 30 ft. on a wheel base of 18 ft. 6 in. with a body overhang of 8 ft. 11 in., and a distance of 2 ft. 6 in. from the front to the front axle. Axle ratio 6 : 1, with a 5-speed gear-box.

A 6 LW. Gardner engine will be used, with a compression ratio of 11 : 1. The cylinder head will be standard, but induction arrangements will be designed to suit the mixing valve. Provision for upper cylinder lubrication will be made. In addition designs are being prepared for an engine to run specifically on producer gas.

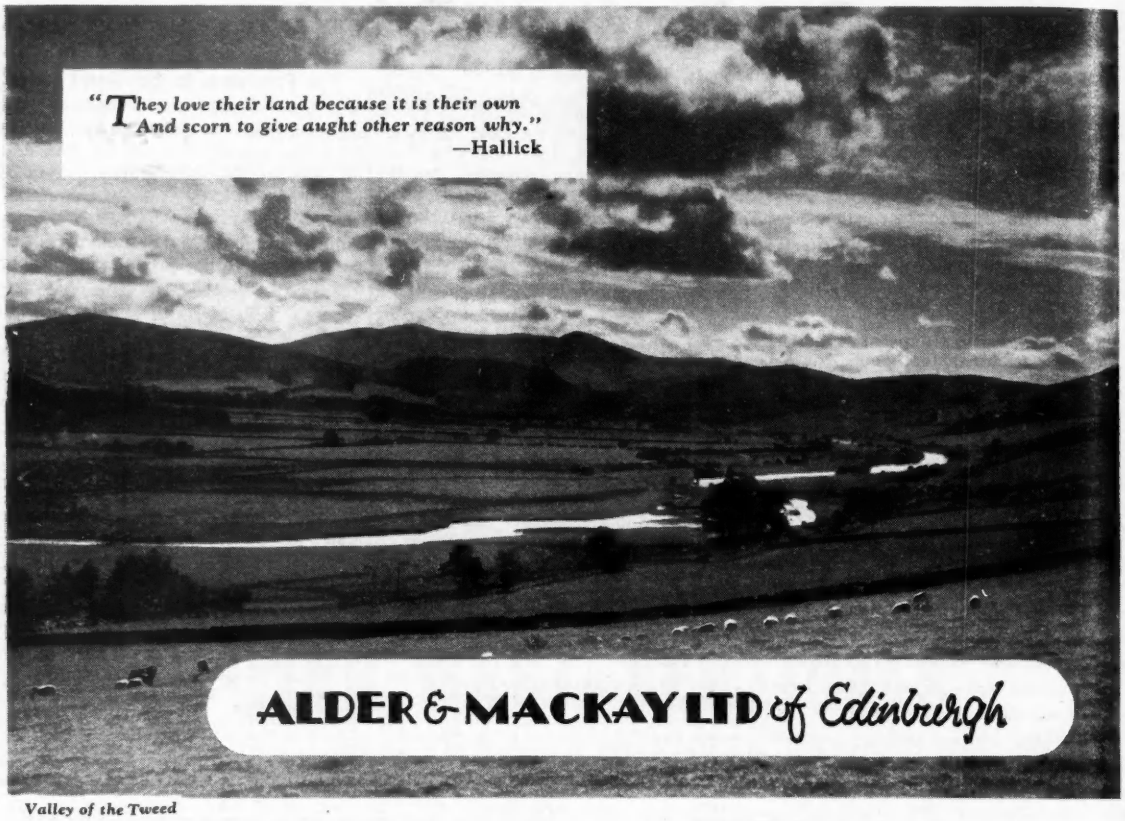
The producer to be used has a capacity of about 4½ cwt. of anthracite, having a hopper diameter of 22 in. The hopper will be made from 16-gauge M.S. sheet with a cast heat-resisting steel front, the fire-box being made from $\frac{5}{32}$ in. material. The producer unit will be arranged for easy detachment and with easy accessibility to the filling door of the hopper.

TRADE CARDS

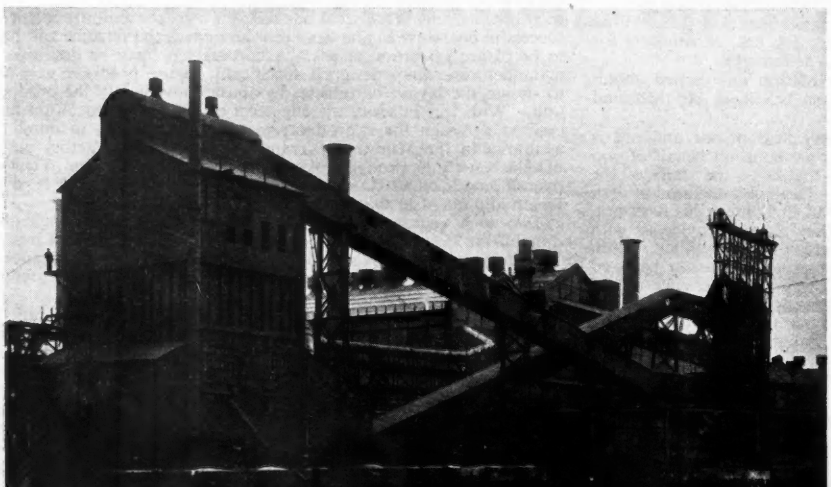
TOM CARRINGTON & CO. LTD.
Lyndon Toolworks, West Bromwich. T/N 0517 (2 lines).
"LYNDON" and "EGA-KUT"
SCREWING TOOLS;
TAPS; DIES; STOCKS AND DIES;
GROUND THREAD TAPS

S.P. Trade Mark.
ENGINEERS BEARINGS
GREY IRON CASTINGS
FOR THE
GAS PRODUCTION TRADE
SAMUEL PLATT LTD.
KING'S HILL FOUNDRY, WEDNESBURY

Arkon
INSTRUMENTS
Gas Flow Recorders and Indicators
Pressure and Vacuum Recorders and Indicators
Full Scale or Inclined Gauges
WALKER, CROSWELLER & CO. LTD.
CHELTENHAM, GLOS. Cheltenham 5172


"They love their land because it is their own
And scorn to give aught other reason why."
—Hallick
ALDER & MACKAY LTD of Edinburgh

Valley of the Tweed



In these days when the need for increased output is vital, a reliable Mechanical Handling Plant is absolutely necessary. Why not consult us? We can still supply to essential industries, and our sixty years' experience will ensure that you get the best possible plant for your particular job.

COAL HANDLING PLANTS

The design and construction of Coal Handling Plants is one of our specialities. Many of the largest plants in the country have been manufactured by us.

SPENCER (MELKSHAM) LTD.
MECHANICAL HANDLING ENGINEERS
MELKSHAM · WILTS · ENG.

CONTENTS

EDITORIAL NOTES

The Institution Meeting 451

INSTITUTION OF GAS ENGINEERS

Review of the Proceedings 452
President's Luncheon 453
Wartime Activities of the Institution .. 454
New Members 454

Presidential Address. By Sir Frederick J. West, C.B.E., M.Inst.C.E., M.I.Mech.E. 455

The Gas Industry in Relation to Post-War Domestic Architecture. By E. Crowther, M.Eng., Assoc.M.Inst. C.E. 457

The Contribution of the Gas Industry in the Domestic Field to National Fuel Economy. By Harold Hartley, D.Sc. 460

Personal 471
National Gas Council 471
Fuel Rationing 471
Parkinson & Cowan, Ltd. 473
Post-War Planning. By A. P. McInnes 473
A Royal Visit 473
Yorkshire Junior Gas Association .. 473

Gas Products Prices 475
Gas Stocks and Shares 475

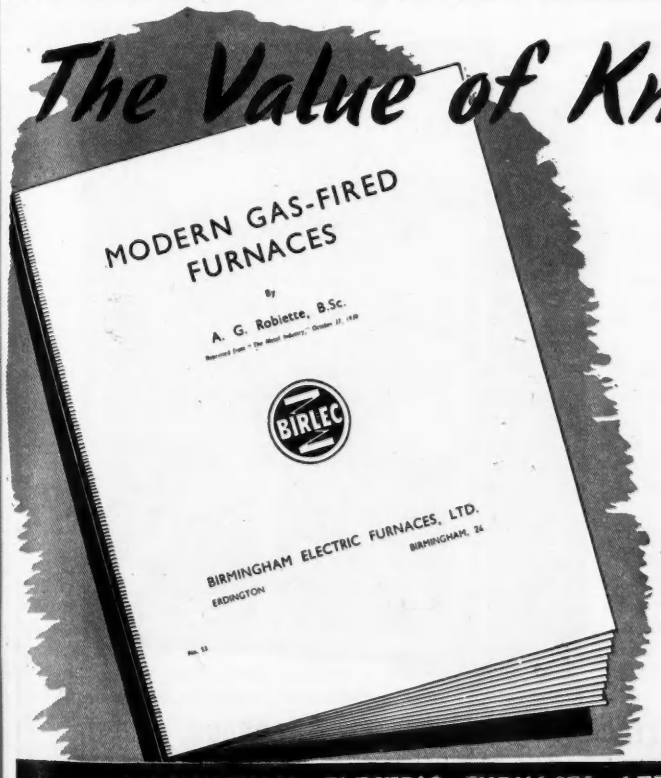
THIS WEEK'S ADVERTISERS

	PAGE
Alder & Mackay, Ltd.	472
Ascot Gas Water Heaters, Ltd.	Cover I
Averill, C. R., Ltd.	446
Baldwins, Ltd.	437
Bale & Church, Ltd. ...	481, 489
Birmingham Electric Furnaces, Ltd.	449
Blakeley, Firth, Sons & Co., Ltd.	489
Bratt, Colbran, Ltd.	430
British Furnaces, Ltd.	483
Chaseside Engineering Co., Ltd.	435
Clapham Bros., Ltd.	482
Clarke, Cluley	476
Clayton, Son, & Co., Ltd. ...	484
Cowan, W. & B.	Cover III
Dempster, R. & J., Ltd. ...	436
Dempster, Robert, & Sons, Ltd.	489
Donkin Co., Ltd. (The Bryan)	Cover II
Drakes, Ltd.	443
Ellison Insulations, Ltd.	489
Ether, Ltd.	478
Evans, Joseph, & Sons (Wolverhampton), Ltd.	Cover IV
Flavel, S., & Co., Ltd.	487
Fluxite, Ltd.	490

	PAGE
"Four Oaks" Spraying Machine Co.	440
Frost, A. E.	489
Gas Meter Co., Ltd.	434
Gas Purification & Chemical Co., Ltd.	489
Glenboig Union Fireclay Co., Ltd.	441
Glover, George, & Co., Ltd. ...	429
Glover, Thos., & Co., Ltd. ...	450
Green & Boulding, Ltd.	489
Griffiths Bros. & Co. (London), Ltd.	467
Harrisons (London), Ltd.... ...	490
Harvey, G. A., & Co. (London), Ltd.	433
Holden & Brooke, Ltd.	476
Holmes, W. C., & Co., Ltd. ...	491
Humphreys & Glasgow, Ltd. ...	448
Hyde, Silas, Ltd.	485
Jenkins, W. J., & Co., Ltd. ...	479
Keith Blackman, Ltd.	492
Kent, George, Ltd.	431
King's Patent Agency, Ltd. ...	490
Kleenoff Co., ...	481
Le Bas Tube Co., Ltd.	447
Londex, Ltd.	476

	PAGE
Macpherson, Donald, & Co., Ltd.	444
Main, R. & A., Ltd.	470
Manchester Oxide Co., Ltd. ...	477
Menno Compressed Air Greasecup Co., Ltd.	489
Mewburn, Ellis & Co.	490
Ministry of Supply	445
Mitchell, H., & Co.	476
Morton, Joseph, Ltd.	476
National Fire Protection Co., Ltd.	444
Newton Chambers & Co., Ltd.	464
Parkinson, W., & Co.	450
Peckett & Sons, Ltd.	489
Powers-Samas Accounting Machines, Ltd.	488
Pulsometer Engineering Co., Ltd.	Cover IV
Radiant Heating, Ltd.	481
Radiation, Ltd.	468, 469
Reavell & Co., Ltd.	480
Russell, R., & Sons, Ltd. ...	473
Stanton Ironworks, Ltd.	490
Stein, John G., & Co., Ltd. ...	442
Stewarts & Lloyds, Ltd.	439
Stoves, Ltd....	433

	PAGE
Strachan & Henshaw, Ltd. ...	429
Sutcliffe, Speakman & Co., Ltd.	485
Sutherland, A. G., Ltd.	486
Technological Institute of Great Britain	489
Thomas & Bishop, Ltd.	475
Trotter, Haines & Corbett, Ltd.	489
Turbine Furnace Co., Ltd. ...	481
Underpressure Engineering Co., Ltd.	478
Walker, C. & W., Ltd.	472
West's Gas Improvement Co., Ltd.	474
Westwood & Wrights, Ltd. ...	438
Wilkes, A. H., & Co.	432
Woodall-Duckham Co.	463
Trade Cards	475
Appointments Vacant	490
Company Notice	489
Educational	489
Gas Undertaking for Sale ...	490
Patents	490
Plant, &c.	489
Plant, &c., For Sale and Wanted	490



The Value of Knowing HOW

"Once a man has established a certain principle, the best testimony to its worth is its adaptability to the most widely divergent design and usage."

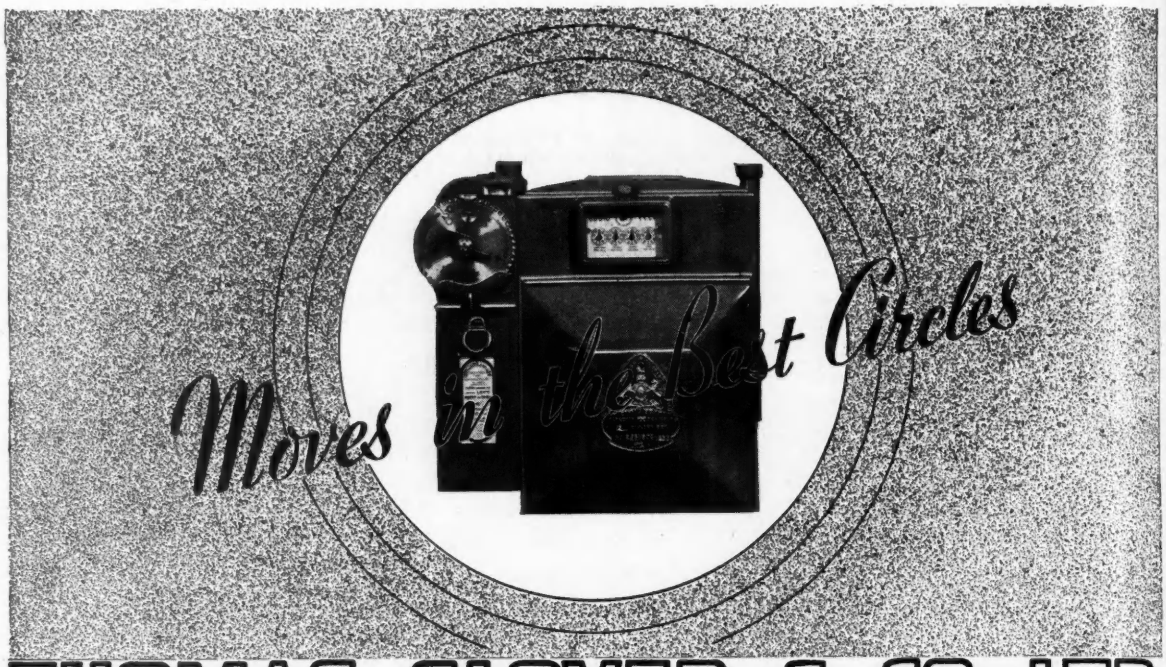
Precisely—and it's in the exclusive proved principles of BIRLEC Furnace design that gas—as a fuel—can provide many features in Heat Treatment which were once thought "exclusively electric."

BIRLEC Gas-Fired Furnaces mark a new epoch in the extension of the use of Industrial Gas to a far wider range of purposes and limits of heat control.

Write for our Booklet on "Modern Gas-Fired Furnaces."

BIRLEC

BIRMINGHAM ELECTRIC FURNACES LTD
ERDINGTON BIRMINGHAM

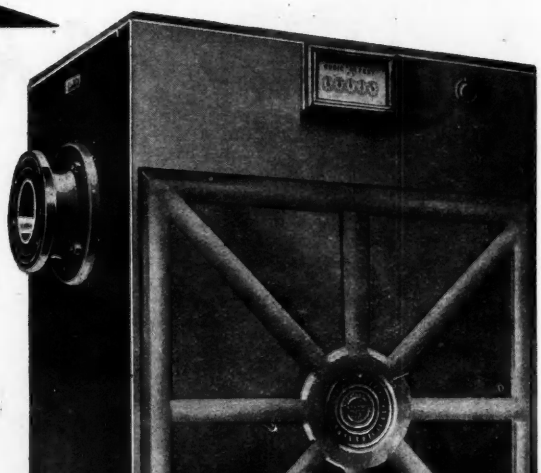


THOMAS GLOVER & CO. LTD.

EDMONTON. LONDON. N.18 and BRANCHES

PARKINSON

INDUSTRIAL METERS



W. PARKINSON & Co. COTTAGE LANE, CITY ROAD, LONDON, E.C. 1

(Incorporated in Parkinson & Cowan (Gas Meters) Ltd.)

Also at Birmingham and Belfast

P. 8